# SERVICE MANUAL

## BTL NOISE BLANKER

# MODEL MA-153

1227 S.PATRICK DR.
SATELITE BEACH, FLA.

7001-4032-200

PRINTED IN U.S.A.
5-79

MA-153

BTL NOISE BLANKER

INSTALLATION INSTRUCTIONS

A. GENERAL

The MA-153 is a noise blanking circuit option consisting of two printed circuit boards intended for installation in the Regency BTL 300 series transceiver. It would be helpful to the installer of the MA-153 option to have the proper BTL Transceiver Service Manual handy for reference.

B. KIT CONTENTS

1. Noise Blanker PCB with wires attached
2. Switch PCB
3. Fishpaper Insulator
4. Mounting Hardware
5. A 47Ω Resistor and a 3300Ω Resistor
6. Installation Instruction

C. INSTALLATION

1. Remove transceiver mobile mounting bracket and hardware. Remove wrap from transceiver chassis assembly.

2. Remove screws holding speaker in place and unsolder speaker wires - note color and location for future resoldering.

3. Drill or punch a 1/8" dia hole in the speaker mounting bracket per Fig. 1.

4. Mount the noise blanker board to the speaker using the supplied screws, sandwiching the fishpaper insulator between the board and the speaker as shown in Fig. 1.

5. Looking at the bottom of the transceiver assembly, perform the following operation with extreme care. Drill three .037" dia (#63 drill) holes in the receiver printed circuit board at points A,B,C, and D as shown in Fig. 2. Remove the section of foil between holes B and C with a sharp knife. Enlarge hole referenced E to .076" dia (#48 drill), refer to Fig. 2.

6. Locate switch board per Fig. 2, clip receiver board leads, in the general mounting area, as close to the board as possible. Solder the switch board in place using the component leads as shown. If needed, cut excess lead length after soldering switch board in place.

7. Terminate the wires from the Noise Blanker/Speaker Assy (Step 4) as follows, refer to Fig. 2.

   a. Solder blue wire into hole C.
   b. Solder brown wire into hole B*.

c. Solder red wire into hole D.
d. Solder center conductor of the larger dia coaxial cable into hole E A. Solder shield into existing nearby hole.
e. Route the smaller dia coaxial cable through the enlarged hole and solder center conductor shield (switch board area) as shown in Fig. 2.
f. Resolder speaker wires to correct terminals as noted in Step 2.
*If used with a tone squelch system, unplug the purple and blue wires coming from the tone board and jumper the two male pins on the receiver board (i.e., reinsert JU-07). Unsolder the blue wire on the tone board and replace with the blue wire coming from the noise blanker board. Strip the purple wire and solder into hole C. Solder the brown wire from the blanker into hole B.

8. The following squelch circuit modifications are required for installing the MA-153 option in the BTL 300 series transceivers manufactured prior to May 1977.

a. Refer to Fig. 3, locate R125, remove and replace with supplied 47Ω resistor.
b. Cut P.C. board land as shown in Fig. 2 and jumper cut circuit with the supplied 3300Ω resistor.

9. Blanker is factory tuned to 40 MHz. If the receive frequency is closer than 1 MHz to 40 MHz or activity near this frequency is great in the area of use, the blanker may be retuned to another frequency in the 35-40 MHz range as follows:

a. Inject 30 mV signal on desired frequency into 50Ω input.
b. Probe collector of Q707 with an analog voltmeter.
c. Adjust C701 and C708 for a peak reading.
d. Reduce signal generator output.
e. Repeat (c) and (d) until tight tuning is achieved.
f. Blanking pulses may be observed with an oscilloscope at collector of Q707. If tuning is done with an oscilloscope, tune for maximum pulse rates with minimum input signal sufficient to produce blanking pulses.

10. Retune L101 in receiver front end after blanker installation. When tuning receiver with blanker installed, remove JU701 from A (diodes) and connect to B (10KΩ resistor) for lowest distortion. Reconnect to A after receiver is tuned. Refer to Fig. 4 in Theory of Operation section.

11. Install noise Blanker/Speaker Assy and secure with hardware from Step 2.

12. Install wrap, mobile mounting bracket and hardware from Step 1.

## D. THEORY OF OPERATION

The BTL noise blanker employs a tuned RF amplifier, a high-speed detector/ blanker-pulse generator to blank the receiver mixer during received noise pulses. It also incorporates a shunt-diode limiter circuit in the receiver audio circuit to eliminate residual noise spikes which may evade the blanker action (Refer to Fig. 4 for schematic).

RF noise approximately 2 MHz removed from the receiver frequency is sampled at R101 ahead of the receiver preselector circuits. This noise is amplified by Q701, Q702 and Q703. Noise pulses are detected and "stretched" by the Q708, Q707 blanker-pulse generator circuit. Positive going pulses from the collector of Q707 then turn on the switching transistor Q705. This action produces a low impedance path to ground across the drain of Q101 (the receiver mixer) during the blanking pulse intervals. Q706 also is turned on if the blanked interval exceeds 0.5 millisecond, and the blanker RF gain is reduced by AGC action on Q702. This prevents a strong CW signal in the noise amplifier bandwidth from disabling the receiver.

The limiter circuit is connected in series with the audio output terminal of IC102. It is a conventional shunt diode limiter employing germanium diodes across a high-impedance audio circuit. Q704 amplifies the resulting limited audio back to the original level delivered by IC102.

## E. SPECIFICATIONS

| | GUARANTEED | TYPICAL |
|---|---|---|
| Tuning Range | 36-42 MHz | - |
| Sensitivity | 800µV(max) | 500µV |
| Blanking Pulse Width | - | 5µs |
| Blanking Pulse Risetime | - | .02µs |
| Maximum Pulse Repetition Rate | - | 200KHz |
| Receiver Sinad Degradation | 6db(max) | 3db |
| Receiver Quieting Degradation: | | |
| Blanker Only | 6db(max) | 3db |
| Blanker and Tone | 12db(max) | 6db |

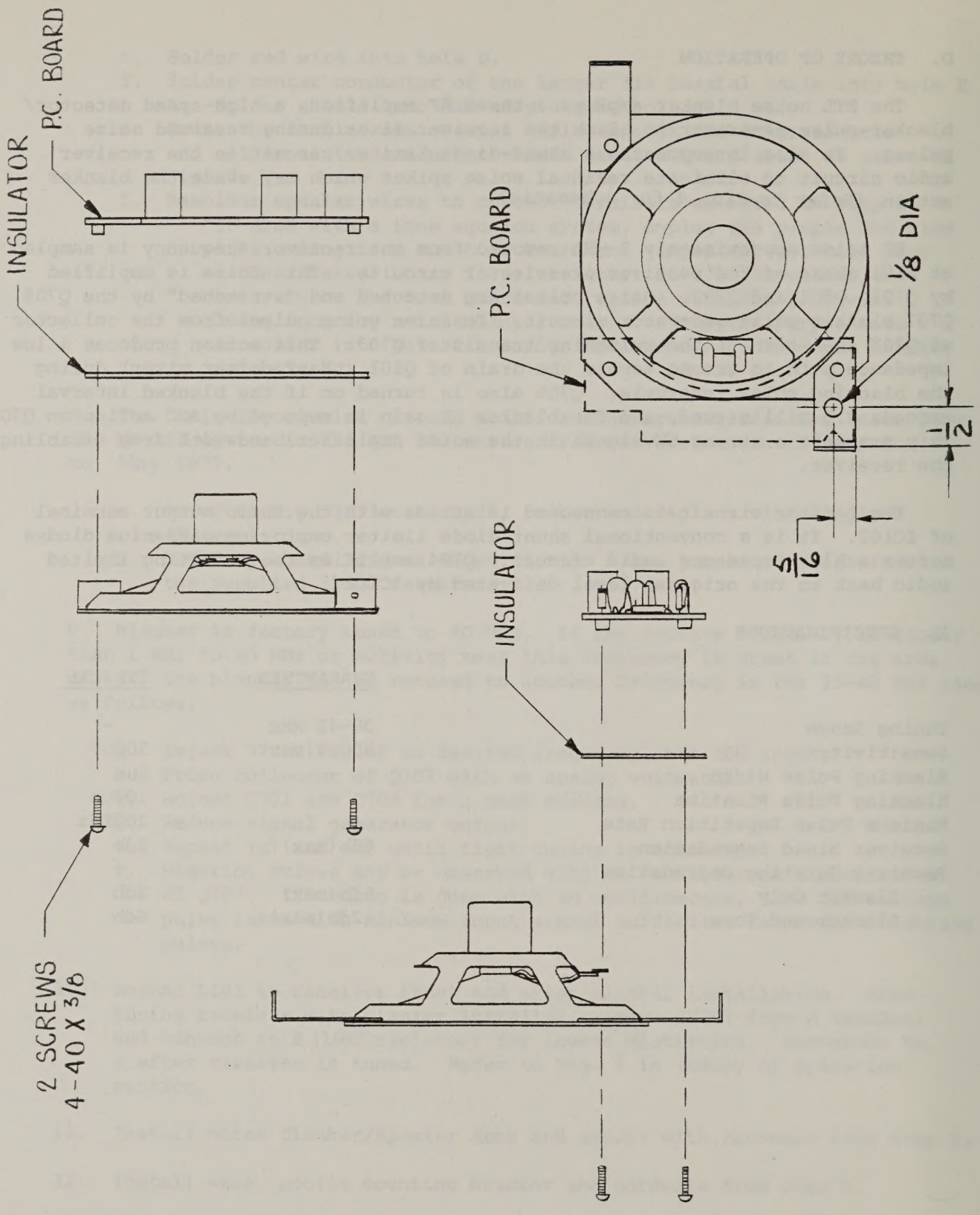

P.C. BOARD
INSULATOR
2 SCREWS
4-40 X 3/8
P.C. BOARD
INSULATOR
1/8 DIA
1/2
5/16

FIG 1

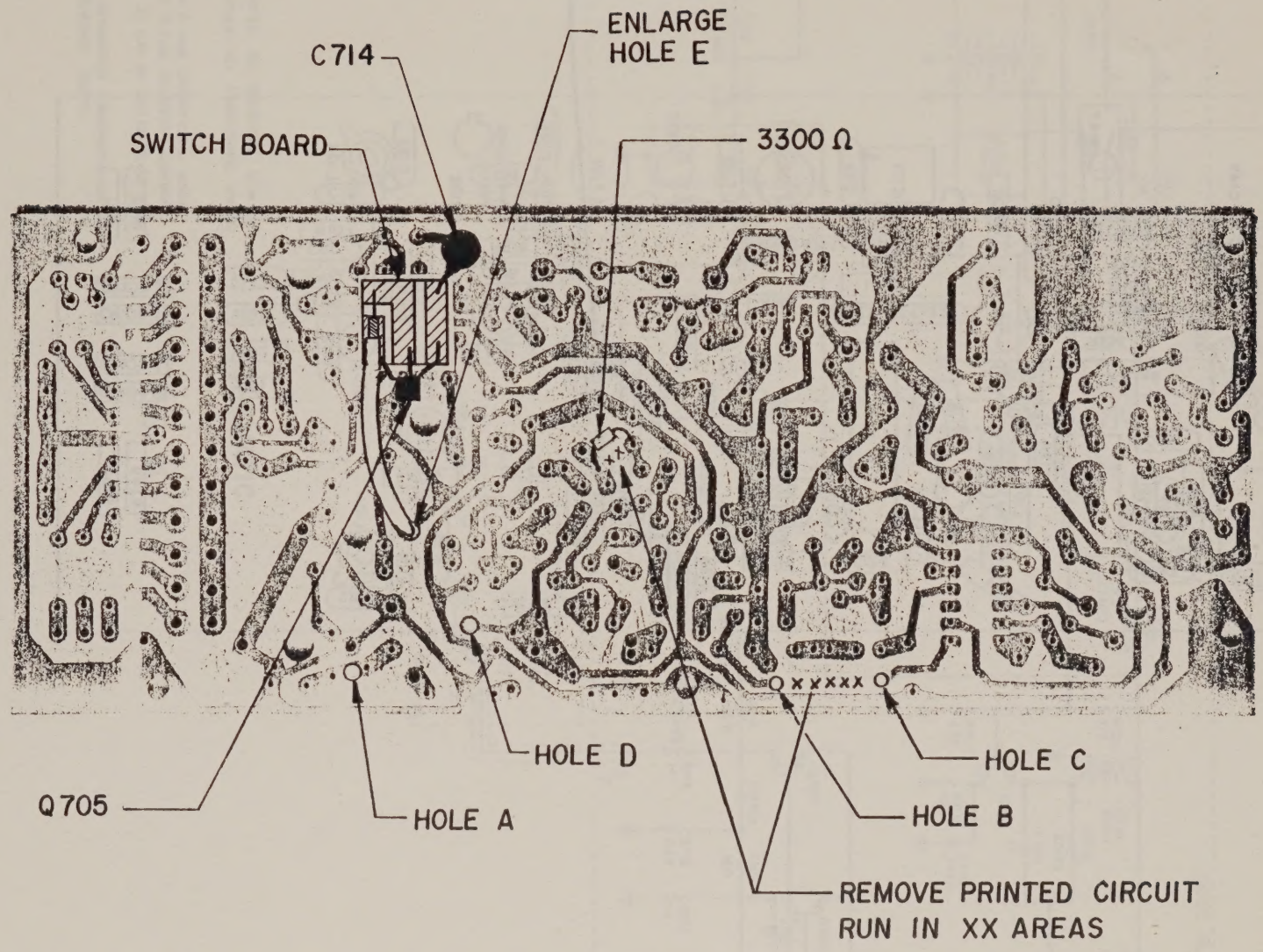

C714
ENLARGE HOLE E
SWITCH BOARD
3300 Ω
Q705
HOLE A
HOLE D
HOLE B
HOLE C
REMOVE PRINTED CIRCUIT RUN IN XX AREAS

FIG 2

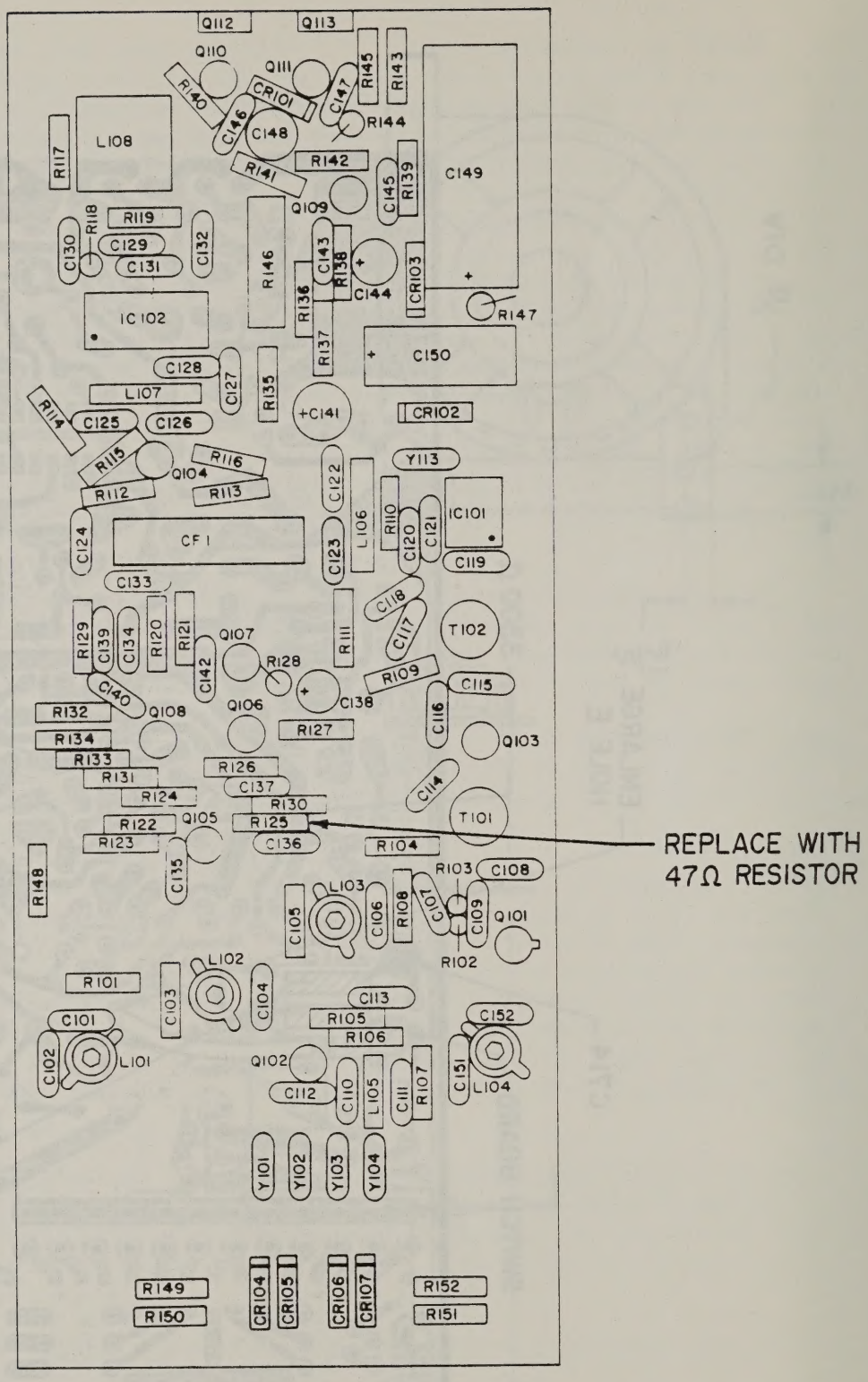
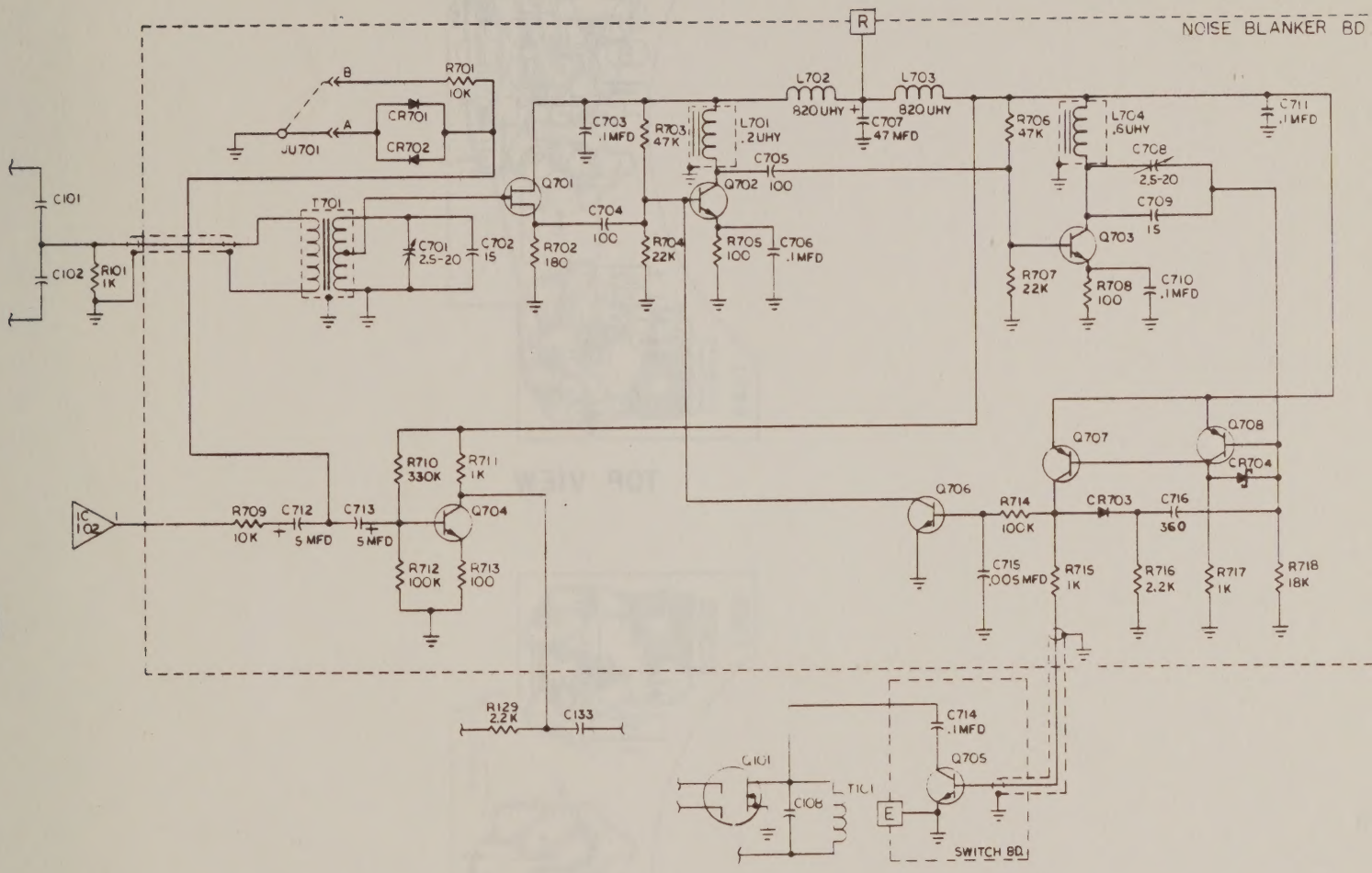



FIG 3

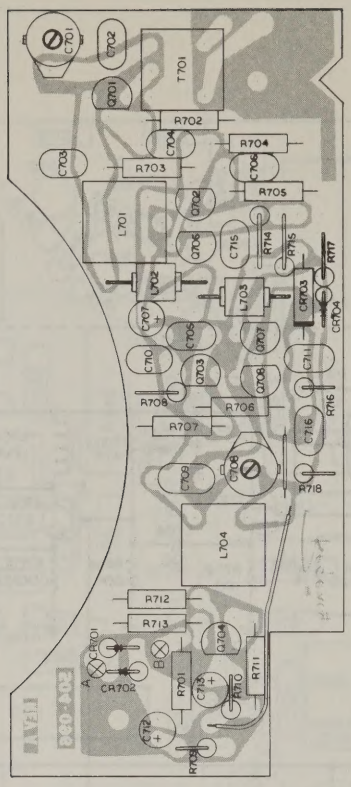



NOTES:

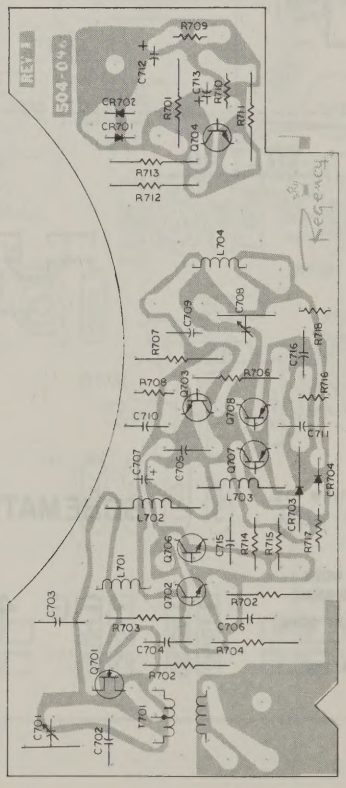
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS 1/4W 10%.
2. UNLESS OTHERWISE SPECIFIED ALL CAPACITANCE VALUES ARE IN PICOFARADS.
3. JU701-TERMINATES AT POINT A FOR OPERATIONAL MODE
   -TERMINATES AT POINT B FOR RECEIVER ALIGNMENT.
4. [R] INDICATES 8.2V RCVR A+ MAY BE CALLED [N] ON SOME SCHEMATICS.
5. 100 SERIES REFERENCE DESIGNATED COMPONENTS ARE LOCATED ON THE BTL RECEIVER BOARD.

## SCHEMATIC

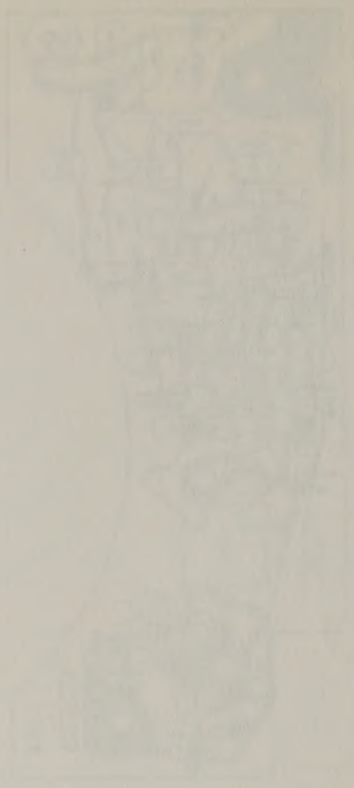
FIG 4



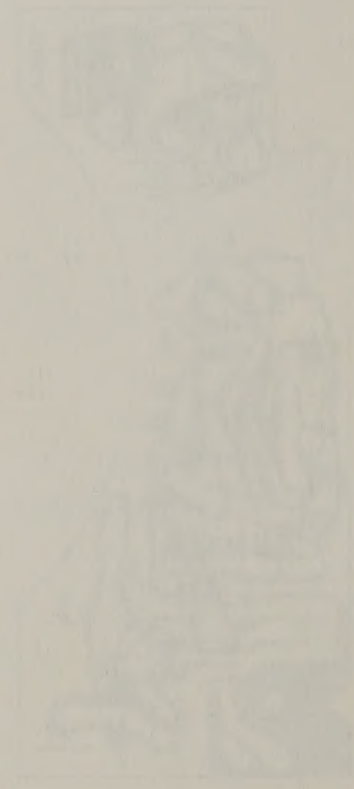

TOP VIEW




BOTTOM VIEW



TOP VIEW



BOTTOM VIEW